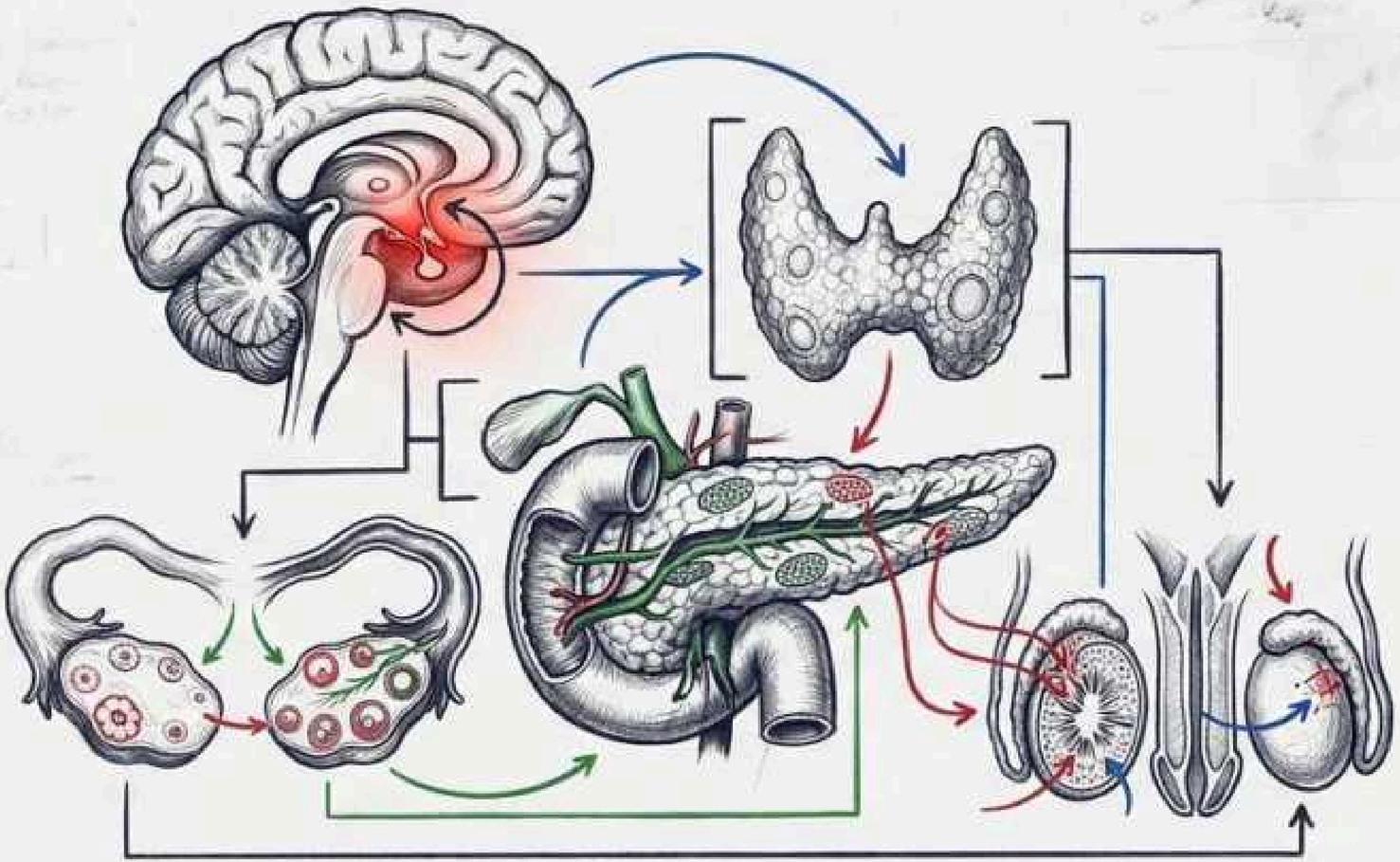
Lecture 6: Obesity, Growth, Puberty & Endocrine Tumours

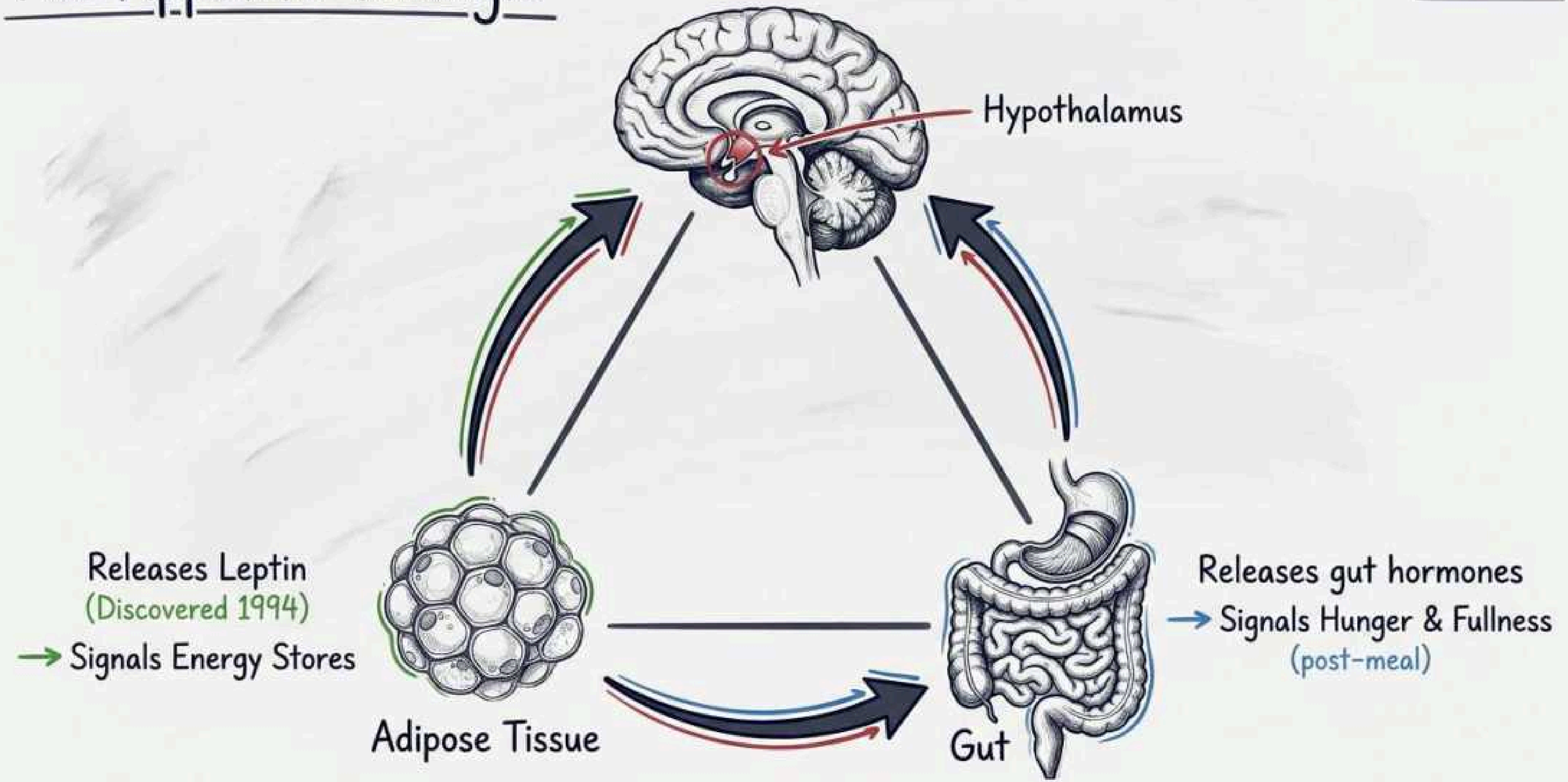
The Science of Balance and Imbalance



MED 531 B

The Appetite Triangle

¶ 6.1

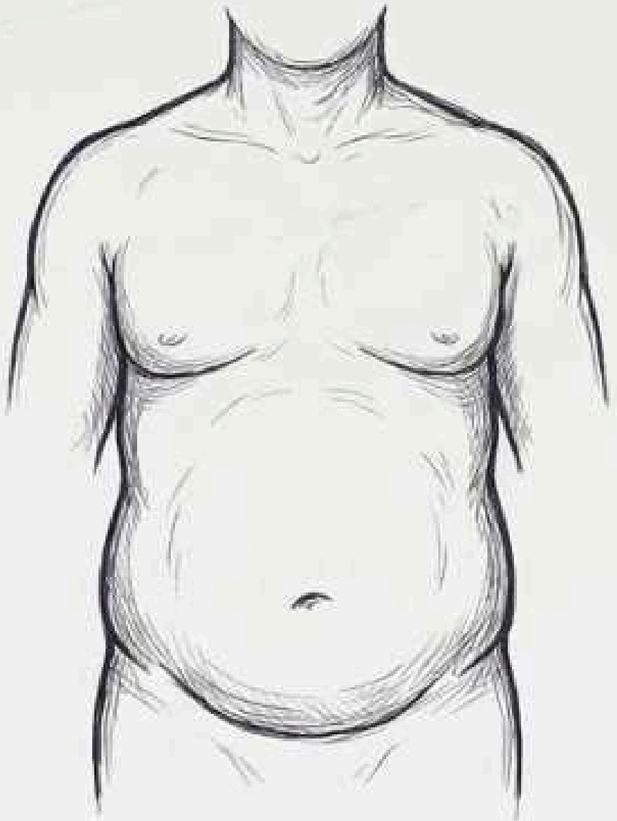


The Systemic Blueprint of Obesity

¶ 6.2

$$BMI = \frac{kg}{m^2} \geqslant 30$$

Thresholds differ by ethnicity. Waist size and fat distribution also matter.



- Type 2 Diabetes
- Heart Disease
- Cancers
- Osteoarthritis
- Sleep Apnoea
- Fatty Liver Disease

Worldwide prevalence has roughly tripled since the 1970s.

Etiology: Genes vs. Environment

¶ 6.3

Rare single-gene forms (e.g., complete leptin deficiency) cause severe childhood obesity. Treatable with leptin.

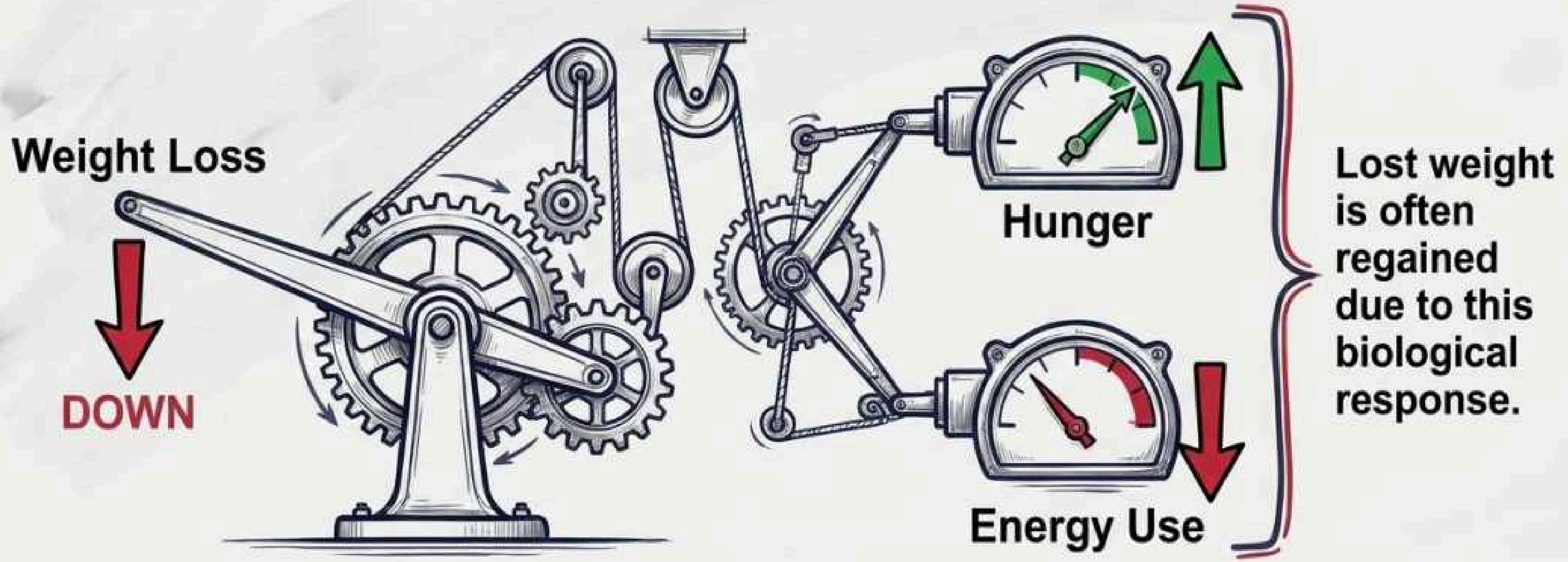


Genes have not changed in 50 years. The dramatic rise in obesity reflects changing diet, activity, and environmental interactions.

Body weight is strongly inherited (proven by twin/adoption studies).

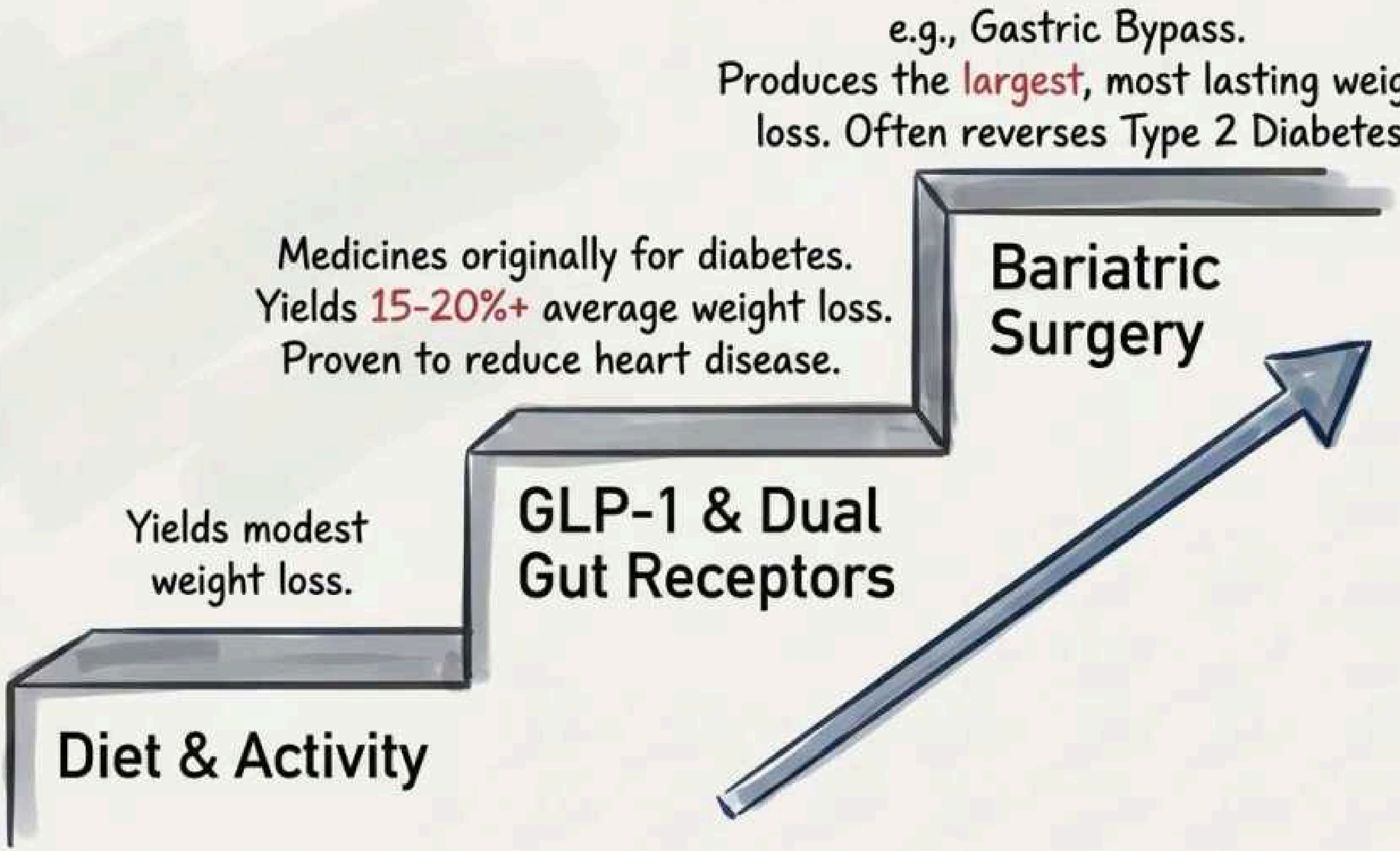
The Metabolic Seesaw

¶ 6.4



This is a biological response, NOT a failure of willpower. Obesity is a chronic disease requiring long-term management.

The Treatment Staircase

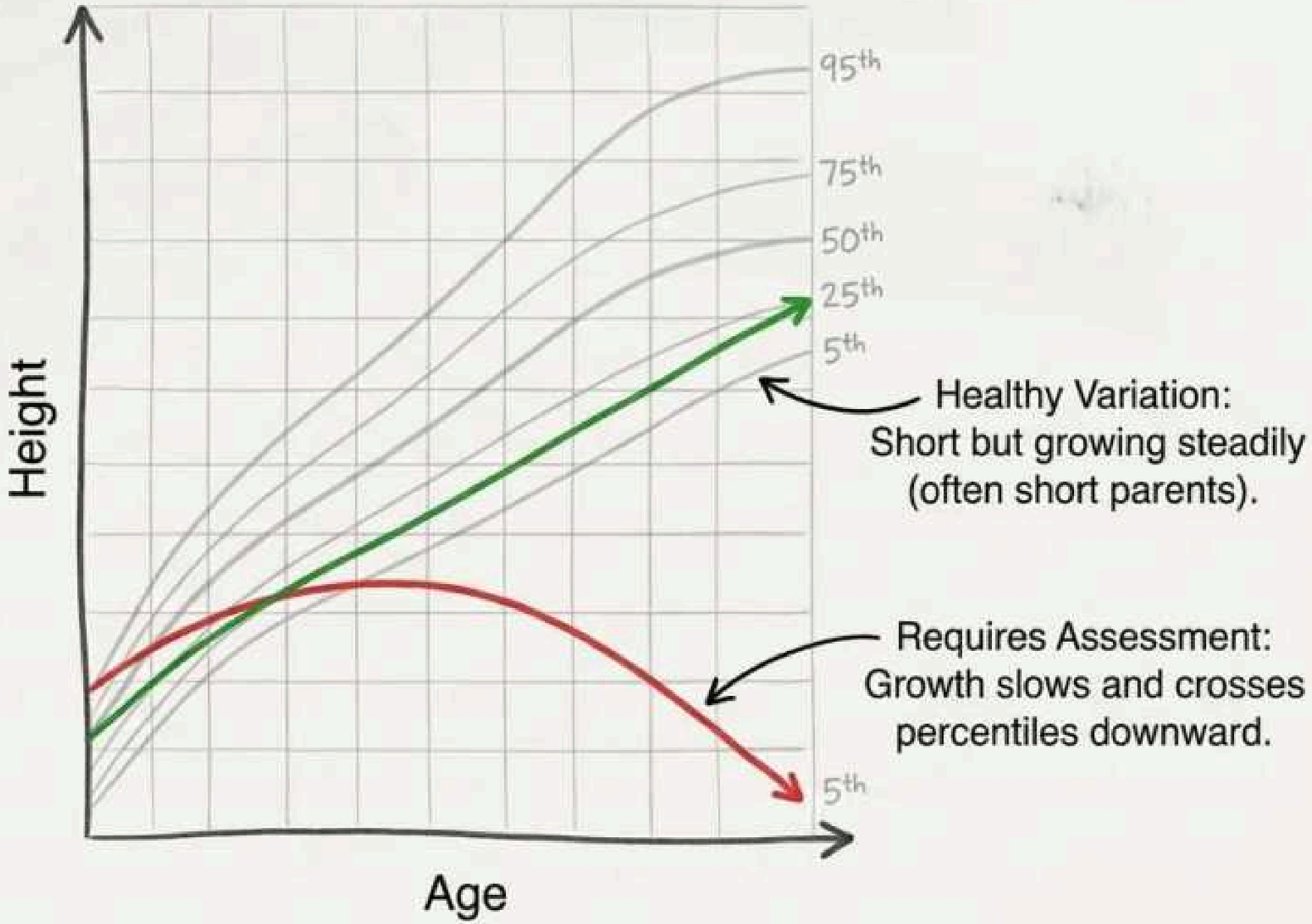


The Growth Trajectory

¶ 6.6

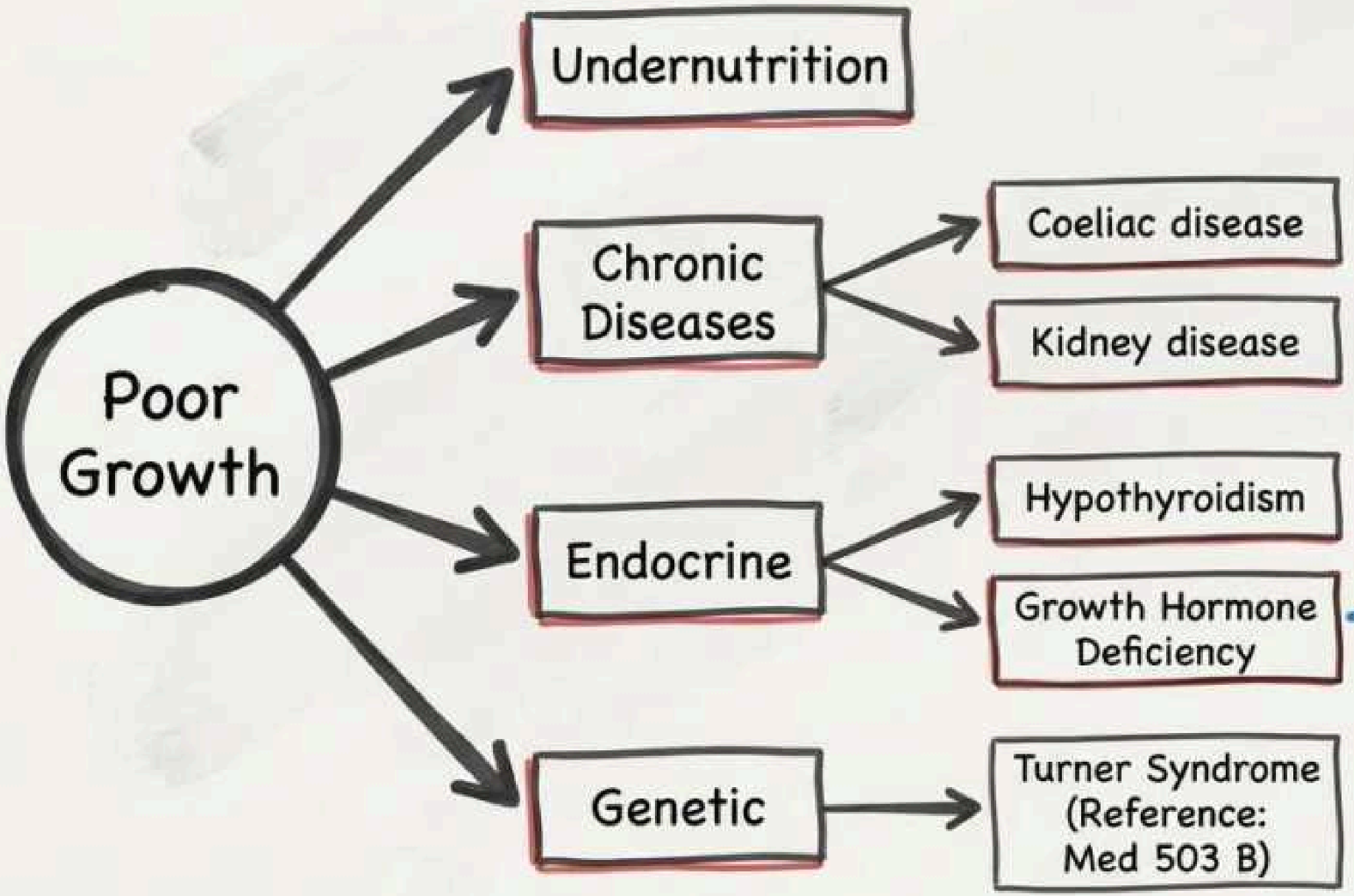
Growth Dependencies:

- Nutrition
- General Health
- Thyroid Hormone
- Growth Hormone
- Sex Hormones



The Growth Deficit Tree

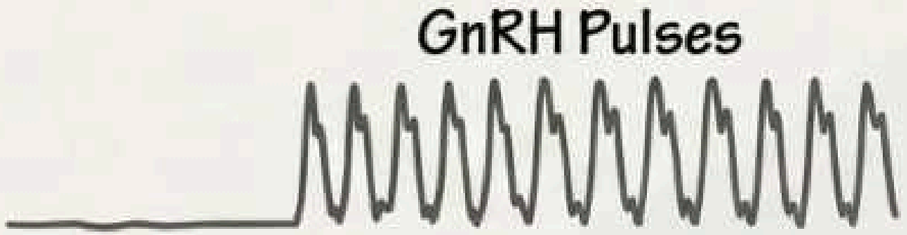
¶ 6.7



Growth Hormone:
Made by recombinant DNA technology since 1985.
Used to treat deficiency and select other conditions.

The HPG Axis & Puberty Pulses

¶ 6.8



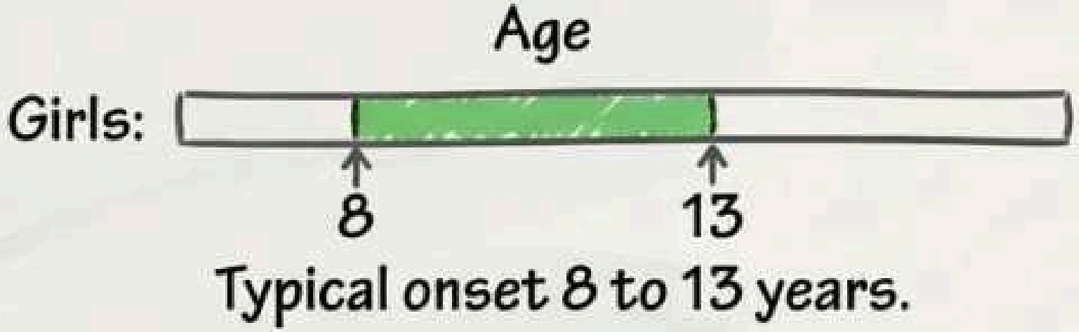
Hypothalamus
(releases GnRH in pulses)

↓

Pituitary
(drives Gonadotropins)

↓

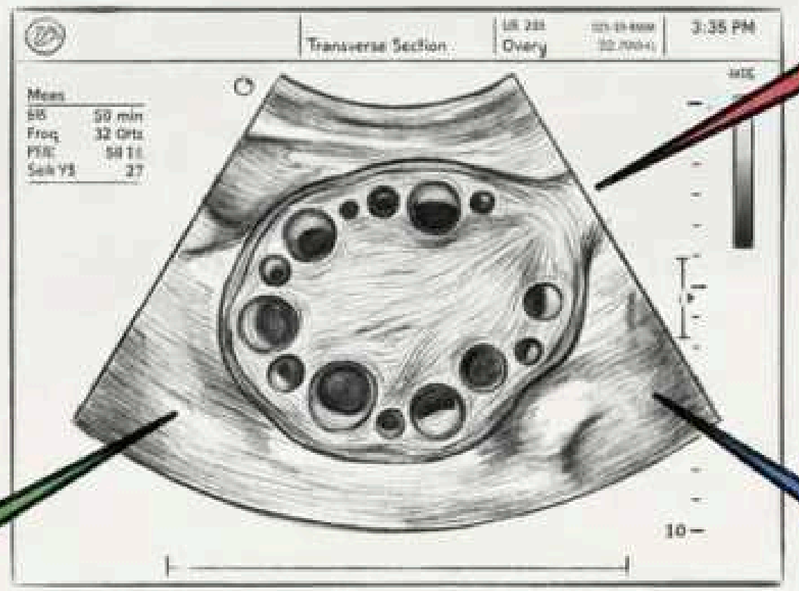
Gonads
(produces Sex Hormones)



Early puberty (especially in boys) and delayed puberty both need assessment, though most delayed puberty is simply a healthy, late-developing child.

The Polycystic Ovary Syndrome (PCOS) Web

The **most common endocrine condition** in reproductive-age women (affects ~1 in 10).



Irregular or absent periods.

Closely linked to Insulin Resistance → Raises Type 2 Diabetes risk.

Higher levels of male-type hormones → Excess hair & acne.

The MEN Inheritance Matrix

Some families inherit genes causing tumours across several endocrine glands.

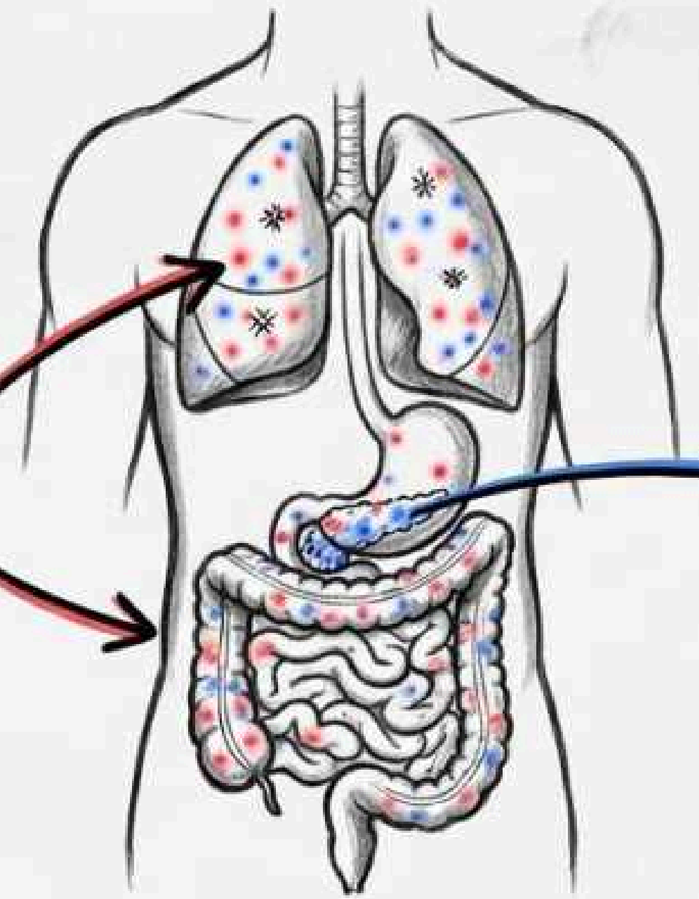
MEN Type 1	Affected Glands: Parathyroids, Pituitary, Pancreas
MEN Type 2	Affected Glands/Conditions: Medullary Thyroid Cancer, Phaeochromocytoma

Genetic Testing Guides Prevention: In families with the MEN2 gene, removing the thyroid in childhood prevents cancer.

The Neuroendocrine Scatter Map

Arise from scattered hormone-producing cells. Many are slow-growing.

Carcinoid Syndrome
→ Releases hormones causing flushing and diarrhoea.



Insulinomas
→ Releases insulin, causing repeated low blood sugar.

The Endocrine Axioms: Course Summary

¶ 6.12

Hormones are chemical messengers controlled by feedback.

Most endocrine disease is simply too much or too little of a hormone.

TSH is the key thyroid test.

Adrenal crisis is the emergency to recognise.

Diabetes harms through the blood vessels.

Osteoporosis is silent until bones break.

Questions?
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